MULTIMEDIA UNIVERSITY®

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

DCS5078 – DATABASE SYSTEMS

(DIT/DBIS Students)

13 OCTOBER 2018
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT:

1. This question paper consists of 11 pages with 40 Multiple Choice Questions and three structured questions.

2. **SECTION A**: Answer **ALL** questions. Please shade your answers on the OMR sheet provided.

3. **SECTION B**: Answer **ALL** questions. Please write your answers in the answer booklet provided.

SECTION A: MULTIPLE CHOICE QUESTIONS (40 MARKS)

Answer ALL questions in this section. Shade your answers on the OMR sheet provided.

1. A(n) _____ is used to create, process and administer databases.

   A. DBMS
   B. OS
   C. OLAP
   D. XML

2. Which of the following is a problem with File System Data Processing?

   A. Increased costs
   B. Maintaining currency
   C. Vendor dependence
   D. Difficult to get quick answers

3. Which type of database would be the most suitable to support the work of several scientists performing research on a new electric motor for electric cars?

   A. Discipline-specific database
   B. Single-user database
   C. Enterprise database
   D. General-purpose database

4. A database is an organized collection of _____ related data.

   A. physically
   B. logically
   C. loosely
   D. commercially

5. _____ database(s) stores historical data and business metrics used exclusively for tactical or strategic decision making.

   A. General Purpose
   B. Operational
   C. Analytical
   D. Historical

6. Most of commercial databases are based on _____.

   A. the network model
   B. the linked-list model
   C. the relational model
   D. the hierarchical model

Continued...

7. _____ yields all the rows in the second table, including those that do not have matching values in the first table.

   A. Left inner join
   B. Right inner join
   C. Left outer join
   D. Right outer join

8. _____ contains all data about objects in a database such as number of columns in each table, authorized users and access privileges.

   A. Data dictionary
   B. Index
   C. System Catalog
   D. Superkey

9. The following statements describe the characteristics of a relational table **EXCEPT**:

   A. The order of the rows and columns is essential to the DBMS.
   B. Each intersection of row and column represents a single data value.
   C. Each table column represents an attribute.
   D. All values in the same column must conform to the same data format.

10. _____ constraints are rules that the DBMS enforces to ensure that data values in one table have corresponding values in another, related table.

    A. Entity Integrity
    B. Referential Integrity
    C. Determinant
    D. Dependent

11. Customers, departments, and products are examples of _____.

    A. entities
    B. attributes
    C. cardinals
    D. relationships

12. Which of the following is an example of an optional attribute to the entity *Student*?

    A. StudID
    B. StudFirstName
    C. StudLastName
    D. StudMiddleName

Continued...

13. Which of the following statements describes the *composite attribute*?

    A. Primary key composed of more than one attribute
    B. Attribute that can be subdivided to produce additional attributes
    C. Attribute that cannot be subdivided
    D. Attributes that have many values

14. Which of the following is an entity that exists independently of other entity types?

    A. Independent entity
    B. Weak entity
    C. Strong entity
    D. Variant entity

15. The following are advantages of storing *Derived Attributes* **EXCEPT**:

    A. Increases data access time
    B. Can be used to keep track of historical data
    C. Saves CPU processing cycles
    D. Data value is readily available

16. Which of the following explains the relationship between *Academic Advisor* and the *Advisee*?

    A. one-to-one
    B. many-to-many
    C. many-to-one
    D. one-to-many

17. The keyword _____ must be used to remove duplicate rows from the results of an SQL SELECT query.

    A. DISTINCT
    B. UNIQUE
    C. PRIMARY
    D. DUPLICATE

18. Which of the following is the correct SQL clause to restrict the results of a SELECT query to only records that have a value in the range of 5.50 to 10.50 in the *ItemPrice* column?

    A. WHERE ItemPrice IN [5.50, 10.50]
    B. WHERE ItemPrice = 5.50 AND 10.50
    C. WHERE ItemPrice BETWEEN 5.50 AND 10.50
    D. WHERE ItemPrice RANGE 5.50 TO 10.50

Continued...

19. Which of the following is the correct SQL clause to sort the results of a SELECT query from the largest number to smallest number using the *Quantity* field?

    A. ORDER BY Quantity DESC
    B. SORT BY Quantity REVERSE
    C. SORT BY Quantity DESC
    D. ORDER BY Quantity REVERSE

20. Given the table *Student(StudID, StudName, Ac_AdvID)*, which of the following SQL statements would be used to add new student data to the *Student* table?

    A. INSERT INTO Student SET StudID='1091155622, StudName='Lee Chong Wei', Ac_AdvID = '1001030912';
    B. INSERT INTO Student VALUES ('1091155622', 'Lee Chong Wei', '1001030912');
    C. ADD NEW Student(StudID, StudName, Ac_AdvID) VALUES ('1091155622', 'Lee Chong Wei', '1001030912');
    D. ADD INTO Student SET StudID='1091155622, StudName='Lee Chong Wei', Ac_AdvID = '1001030912';

21. Which of the following SQL commands will remove the *DOB* column in the *Developers* table?

    A. DROP TABLE Developers REMOVE COLUMN DOB;
    B. ALTER TABLE Developers DROP COLUMN DOB;
    C. ALTER TABLE Developers REMOVE COLUMN DOB;
    D. EDIT TABLE Developers DROP COLUMN DOB;

22. If attribute *M* is functionally dependent on a composite key *J* but not on any subset of that composite key, the attribute *J* is _____ on *M*.

    A. functionally dependent
    B. partially dependent
    C. fully functionally dependent
    D. partially functionally dependent

23. _____ is a functional dependence in which the determinant is only part of the primary key.

    A. Functional dependency
    B. Partial dependency
    C. Transitive dependency
    D. Active dependency

Continued...

24. Which of the following is **FALSE** about conversion to 1st Normal Form?

    A. Eliminate the repeating groups
    B. Identify the foreign key
    C. Identify all dependencies
    D. Reassign corresponding dependent attributes

25. Which of the terms best describes the statement given below?

    "Used by designers when the primary key is considered to be unsuitable"

    A. Primary Key
    B. Secondary Key
    C. Super key
    D. Surrogate key

26. The _____ is the table that has no multivalued dependencies.

    A. 1st Normal Form
    B. 2nd Normal Form
    C. 3rd Normal Form
    D. 4th Normal Form

27. _____ phase in SDLC involved with user requirements, existing system evaluation and logical design.

    A. Planning
    B. Implementation
    C. Analysis
    D. Maintenance

28. The phases involved in Database Life Cycle (DBLC) are _____.

    A. Initial Study → Database Design → Implementation and Loading → Testing and Evaluation → Operation → Maintenance and Evolution
    B. Database Design → Initial Study → Implementation and Loading → Testing and Evaluation → Operation
    C. Implementation and Loading → Testing and Evaluation → Operation
    D. Initial Study → Implementation and Loading → Database Design → Operation → Testing and Evaluation → Maintenance and Evolution

29. All of the following describe sources of database failure **EXCEPT**:

    A. Software.
    B. Hardware.
    C. Information.
    D. Transaction.

Continued...

30. _____ is a type of backup that will only affect object or data that has been changed since last full backup.

A. Transaction log backup
B. Differential backup
C. Full backup
D. Semi-backup

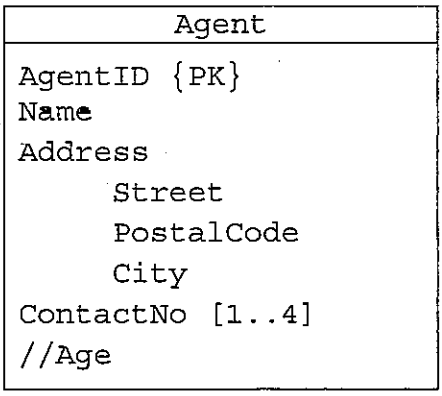
31. Which of the following is **NOT** the step involved in conceptual design?

A. Data analysis and requirements
B. Entity relationship modelling and normalization
C. Data model verification
D. Implementation of data design

32. In UML, _____ attribute can be modelled by indicating the lower and upper limits next to the attribute's name.

A. derived
B. composite
C. multivalued
D. association

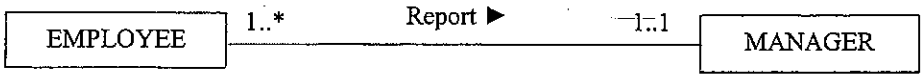
33. Based on the diagram below, what kind of attribute does **ContactNo** represent?



A. Composite attribute
B. Derived attribute
C. Standalone attribute
D. Multi-valued attribute

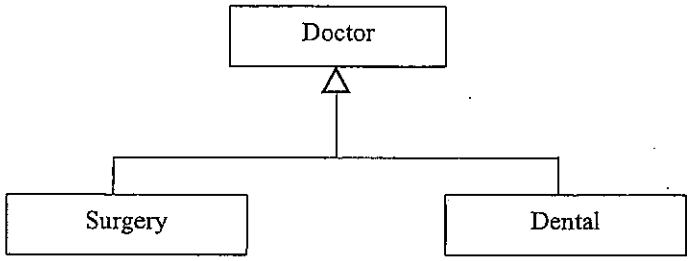
Continued...

34. Which of the following statements is **FALSE** description about the diagram?



A. The association is many to one from EMPLOYEE to MANAGER.
B. One or many EMPLOYEE can report duty to one MANAGER.
C. One MANAGER can supervise only one EMPLOYEE.
D. The minimum multiplicity for MANAGER is 1.

35. Which of the following is **FALSE** about the diagram below?



A. Surgery and Dental inherit attributes from Doctor.
B. Doctor is the subtype of Surgery and Dental.
C. Dental is the supertype of Surgery.
D. Surgery has its own unique attributes and characteristics.

36. Relationship, known as _____ in UML is represented by a_____ connecting the participating classes.

A. line, multiplicity
B. association, line
C. method, association
D. association, multiplicity

37. Based on the given statement below, which of the following data security and the information security framework it is referring to?

"Helps prevent dirty data by coordinating across multiple systems."

A. Dirty Data
B. Data Quality
C. Data Profiling Software
D. Master Data Management

Continued...

38. Based on the statements below, at which organizational level does a database play a critical role in an organization?

- *Enable strategic decision making and planning*
- *Identify growth opportunities*

A. Top management level
B. Middle management level
C. Lower management level
D. Operational management level

39. _____ is responsible for control of the centralized and shared database.

A. Information systems (IS) department
B. Database administrator
C. Systems administrator
D. Data administrator

40. Which of the following is **NOT** the Database Administrator's technical role?

A. Maintain the DBMS, utilities, and applications
B. Operate the DBMS, utilities, and applications
C. Design and implement databases and applications
D. Manage data security, privacy, and integrity

Continued...

SECTION B: STRUCTURED QUESTIONS (60 MARKS)

Answer ALL questions in this section. Write your answers in the answer booklet provided.

Question 1 **(20 Marks)**

A group of DIT students is raising funds for orphans in need through a car wash service. You have been requested to create a simple database for them to keep track of the operation. You are required to draw a complete **Crow's Foot ERD** based on the following descriptions. You must clearly show the *connectivity* and the *relationship participation* in the diagram.

Many customers send their vehicle for car wash services. A student will be in charged to record each customer's information such as name, contact number and email address when the customer makes an appointment for a service. Each customer may send more than one vehicle for the services. Therefore, the clerk will take note on the vehicle information such as vehicle model, vehicle type and plate number. Sometimes, the customer may make a few appointments for the same car. The appointment details such as date and time will be recorded.

Customers will choose a package for each appointment. Each package consists of different types of services. For example, Package A consists of car wash, wax and vacuum. Package B of car wash and vacuum, and Package C is just car wash only. The price/charge for Package A is RM 20.00, Package B is RM 12.00 and Package C is RM 6.00. This price is for small cars or sedan vehicle type only. Vehicle types such as MPV, SUV or bigger personal vehicle, additional RM3.00 will be charged.

Based on the situation given above, draw a complete Entity Relationship Diagram using the **Crow's Foot** notation which include:

(i) All entities and attributes
(ii) Relationships
(iii) Connectivity and relationship participation
(iv) Primary and foreign keys

Continued...

Question 2 **(20 Marks)**

Use the following sample Product data for CDP BEST Computer Shop:

Product TABLE

ProdID	ProdDesc	PurchasedDate	ProdPrice	Discount	VendorID
12033HP	Printer	15/8/2017	230.00	0.05	25229
14233WD	Hard Disk	23/4/2016	280.00	0.25	25233
18874CS	RAM	1/4/2011	443.00	0.10	25233
Q8070IT	CPU	14/5/2013	880.00	0.05	23371
Q8090IT	CPU	14/5/2013	1280.00	0.05	24111
18875AP	RAM	3/8/2013	440.00	0.25	25233
14558SG	Hard Disk	9/9/2006	345.00	0.10	25229

Write the SQL statements for the following:

i) Display product ID, product description, product purchased date and vendor ID with product price less than RM 300.00. [5 m]

ii) Change the discount to 0.25 for all product sold by vendor with id 25233. [3 m]

iii) Display all columns from Product table with product's price between RM300.00 to RM500.00. [3 m]

iv) Display the vendor ID for every product that contains the product description start with alphabet "C". [2 m]

v) Insert new values for product table. The new values are as below: [3 m]

Product ID: 5500TINV
Product Description: Graphic Card
Product Purchased Date: 28/5/2017
Product Price: RM 880.00
Product Discount: 15%
Vendor ID: 21113

vi) Display the number of purchase from the same vendor and the vendor ID where the number of purchased was made more than once. [4 m]

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Question 3 (20 Marks)

A software consultancy firm maintains details of all the various projects in which its employees are currently involved. These details comprise:

StaffID	StaffName	ContactNo	DeptCode	DeptName	ProjCode	ProjDesc	Progress
201129	Mohd. Ashraf	017-9931978	HRM	Human Resource	P111	Software Testing	35%
201120	Logeswari	012-2106975	FIN	Finance	P112	E-learning	42%
201129	Mohd. Ashraf	017-9931978	FIN	Finance	P113	Service Desk	20%
201122	Travinder	019-2611990	MKT	Marketing	P114	Creative Design	56%
201122	Travinder	019-2611990	HRM	Human Resource	P112	E-learning	37%
201124	Tey Ting Wei	019-6091996	HRM	Human Resource	P113	Service Desk	89%
201120	Logeswari	012-2106975	ADM	Admin	P111	Software Testing	66%
201120	Logeswari	012-2106975	MKT	Marketing	P113	Service Desk	23%
201124	Tey Ting Wei	019-6091996	HRM	Human Resource	P112	E-learning	64%
201122	Travinder	019-2611990	ADM	Admin	P112	E-learning	12%
201129	Mohd. Ashraf	017-9931978	MKT	Marketing	P111	Software Testing	54%

a) Write 1st, 2nd, and 3rd Normal Forms. [14.5 m]

b) Draw the Dependency Diagram for 2nd Normal Form. [5.5 m]

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